



Final Report: Targeted Inspection of CN Operations (Phase 1 of Transport Canada Action Plan to Address CN Safety Issues)

January 5, 2006



Transport
Canada

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EXECUTIVE SUMMARY

Recent Canadian National (CN) derailments and associated environmental spills have generated significant attention and questions about CN's safety performance.

Transport Canada's Rail Safety Directorate developed a two-phased Action Plan in August 2005 to assess overall compliance and safety of CN. Phase 1 of this Action Plan, the subject of this report, comprised:

- an analysis of relevant data to examine safety trends and issues at CN; and,
- targeted safety inspections of CN operations between August 22 and September 16, 2005 to determine the railway's level of compliance with applicable safety requirements.

The findings of the targeted inspections reiterate previous concerns raised by the Directorate:

Equipment:

- high safety defect rates of CN rolling-stock (Locomotive and Freight Cars)
- mechanical personnel following non-compliant processes in performing safety inspections

Operations:

- inaccurate Train Consists
- operating crews following an incorrect process in performing Brake Tests
- non-compliance to securement of equipment requirements (CROR 112)
- necessity for Rules for Transfer Movements and Remote Control Locomotive Operations
- non-compliance to the Canada Labour Code Part II, On Board Train Regulations

Engineering:

- non-compliance to Track Safety Rules, in the areas of track inspection, testing and maintenance
- deviations to the Track Safety Rules during inspections conducted by track geometry car and rail flaw detector car
- non-compliance with Crossing Warning Signal inspection, testing, and maintenance requirements
- non-compliance with crossing surface, sightline and signage requirements

The targeted four-week inspection identified a number of non-compliant conditions. The majority of these individual non-compliances or safety issues did not pose a threat or immediate threat to safety. On their own, they would likely not lead to derailments. However, six were of sufficient concern to warrant the issuance of Notices and Orders:

- two concerning the accuracy of train journals;
- two concerning operations on the Squamish Subdivision;
- one concerning poor flagging practice by a third party; and,
- one concerning the high number of cars with safety defects found in Prince George, Quesnel and Williams Lake terminals

In addition, concerns associated with track conditions and restricted sightlines (hindering automobile operator's vision of oncoming trains at crossings) were raised at 36 different locations by Transport Canada inspectors during the targeted inspection activity. In each of these locations, CN took corrective action by imposing speed restrictions, either for poor sightline visibility or poor track conditions.

CN cooperated in all aspects of Transport Canada's targeted inspection activity. When requested, CN acted promptly in addressing safety concerns and providing corrective actions.

The results of the targeted inspection activity were presented to CN Executive on September 27, 2005. CN Rail submitted requested Corrective Actions to Transport Canada on October 11, 2005. These are included in this report in Part 2 Section 3.0.

A Draft Report dated November 26, 2005 was prepared and submitted to CN. Comments from the company were received on December 16, 2005 and this Final Report was produced.

Transport Canada is generally satisfied with CN's Corrective Action Plan and emphasizes the importance for CN to address the underlying, systemic nature of the safety problems. To this end, Transport Canada will monitor the implementation of CN's Corrective Actions to verify that they have the desired effect and contribute to continued improvements in the level of safety.

The second phase of Transport Canada's Action Plan – an audit of CN's Safety Management practices - is currently underway and will be complete early in the New Year.

INTRODUCTION

1.1 OVERVIEW OF CN OPERATIONS

Canadian National (CN) is a Class 1 railway and Canada's largest rail network which spans the nation and serves all of Canada's major ports and includes strategic connections into the United States. Originally established as a Crown Corporation, the company has operated as a private sector investor-owned railway since 1995.

In Canada, CN employs an average of 13,000 people and owns over 12,000 route-miles of track. The company's revenues derive from the movement of goods including petroleum and chemicals, grain and fertilizers, coal, metals and minerals, forest products, inter-modal and automotive.

CN has a total of 2,100 locomotives and 92,000 rail cars which operate throughout Canada and the United States. It also operates thousands of rail cars which are owned by other companies.

CN is organized in two geographic divisions in Canada: Western Canada (based in Edmonton), and Eastern Canada (based in Toronto). Within each division the major functions include Engineering, Mechanical, Operations, and Sales and Customer Service.

1.2 BACKGROUND

On August 3, 2005, 45 cars from a CN train jumped the tracks and caused "bunker-c" fuel oil and pole-treating oil to leak into nearby Lake Wabamun in Alberta. Two days later, another CN train derailed over the Cheakamus River canyon north of Vancouver. A ruptured tank car sent 40,000 litres of highly corrosive caustic soda into the river.

The severity of these derailments, along with an overall increasing trend in the number of mainline track derailments, made it incumbent on the Rail Safety Directorate to undertake action specifically targeted at CN.

The Directorate subsequently developed an Action Plan to address CN safety issues.

1.3 METHODOLOGY

Transport Canada's Director General Rail Safety was responsible for executing the Action Plan with the participation of Regional and Headquarters staff. CN was informed of the Action Plan and cooperated in all aspects.

The Action Plan is comprised of two Phases:

Phase One:

- **An Analysis of Safety Trends and Issues**

The Rail Safety Directorate conducted an analysis of relevant data to examine safety trends at CN. This included an analysis of mainline track derailment data and issues identified in regulatory activities performed by Transport Canada.

- **Targeted Inspection Activity**

The Rail Safety Directorate conducted targeted safety inspections of CN operations over a four-week period (August 22 to September 16, 2005) to determine the railway's level of compliance with the applicable Rules, Regulations, Orders and Standards. Inspections were conducted in CN's Equipment, Operations and Engineering areas.

Phase One of the Action Plan was completed in late September 2005 and is the subject of this report.

Phase Two:

- **An Audit of CN's Safety Management Practices**

The analysis of safety trends, and the issues and results of the targeted inspections, will lead to a risk-based audit of CN's Safety Management System. This audit will focus on the assessment of CN's safety management processes.

The Audit is scheduled to be completed in December 2005, and will be the subject of a Phase Two report.

1.4 FORMAT OF REPORT

There are two Parts to this report:

Part 1 – provides a summary of the data analysis of railway safety trends and issues at CN over the last five years

Part 2 – provides a summary of the results of the four-week targeted inspection activity at CN.

PART 1 ANALYSIS OF SAFETY TRENDS AND ISSUES

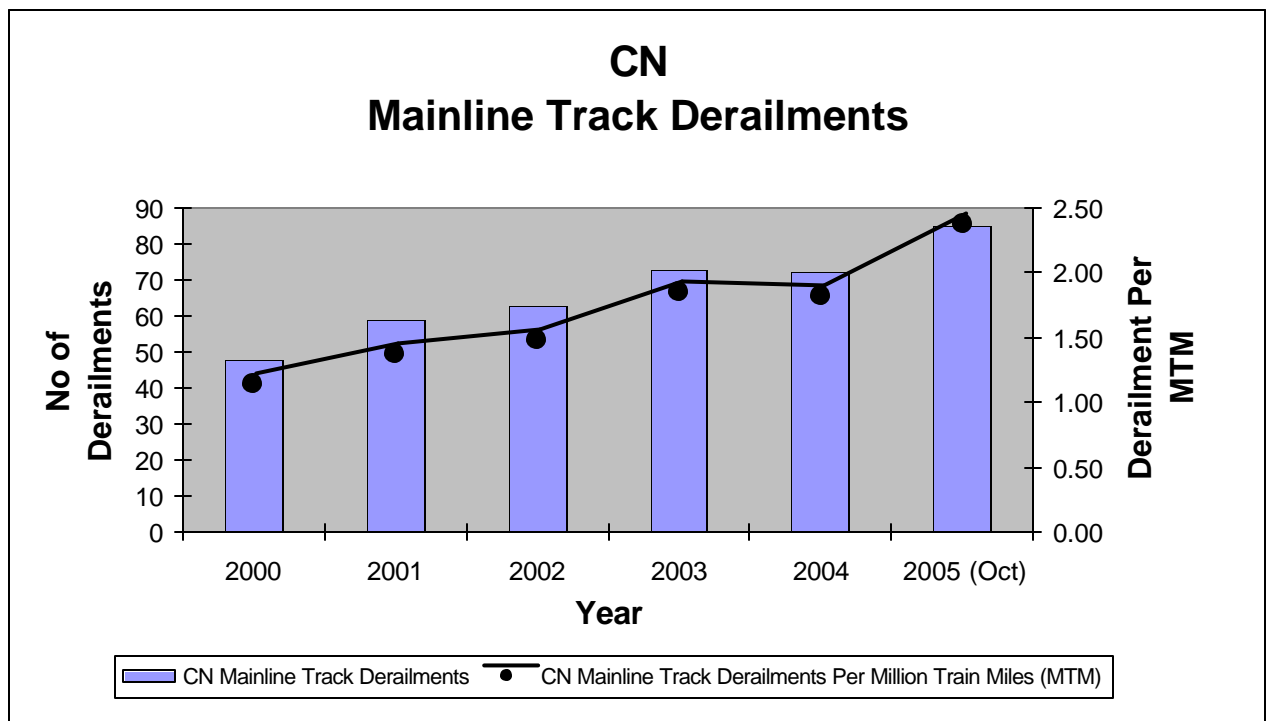
1.0 INTRODUCTION

The Rail Safety Directorate conducted an analysis of relevant data to examine safety trends and issues at CN. This included an analysis of CN mainline track derailment data, and issues identified through regulatory activities conducted by Transport Canada.

2.0 CN MAINLINE TRACK DERAILMENT DATA

Transportation Safety Board (TSB) reportable accident/occurrence data¹ was compiled to examine mainline track derailment trends at CN over the last five years.

Exhibit 1. Mainline Track Derailments



Note – includes Mainline Track Derailment data on BC Rail effective July 14, 2004

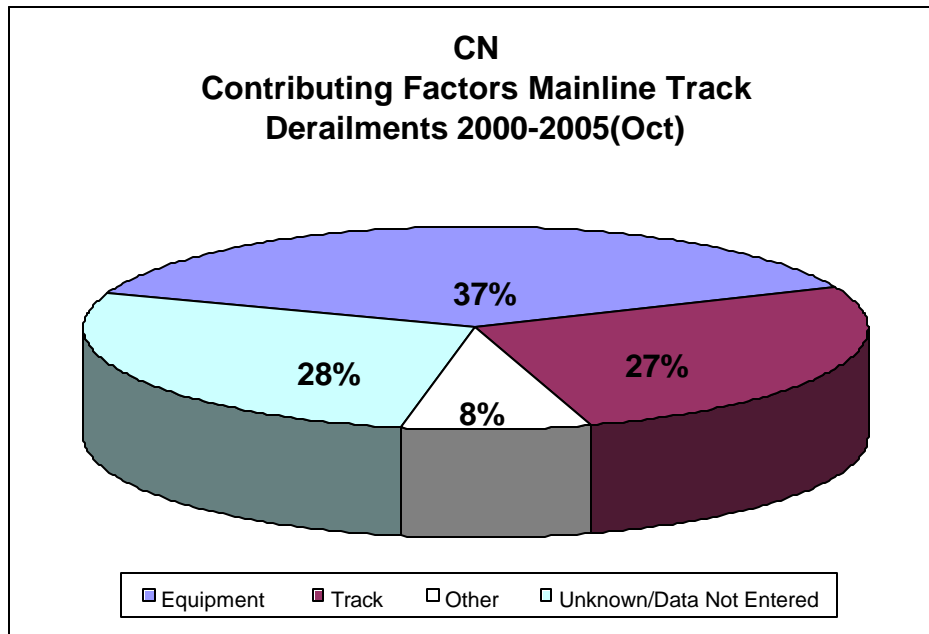
The number of CN Mainline Track Derailments (where CN was both track owner and train operator) has jumped from 48 in 2000 to 72 in 2004, an increase of 50%. CN's 85 derailments to October 2005, represents an increase of over 75% in the number of CN Mainline Track Derailments since 2000.

¹ Derailment data used in the Transport Canada analysis in this report is taken from the Transportation Safety Board (TSB) Federal - Provincial data-base which contains occurrence information reported by Railway Companies in accordance with TSB accident/incident reporting requirements.

Contributing Factors to CN Mainline Track Derailments

As illustrated below, two of the major contributing factors² to CN mainline track derailments over the last five years have been Track and Equipment. Since 2000, Equipment has been identified as a contributing factor in 37% of CN's Mainline Track Derailments (where CN was both track owner and train operator), followed by Track as a contributing factor in 27% of the derailments. Note that some derailments have been identified with multiple contributing factors.

Exhibit 2 CN Mainline Track Derailments - Contributing Factors



Contributing Factors - CN Mainline Track Derailments:

Contributing Factor	Number of Derailments					
	2000	2001	2002	2003	2004	2005*
Equipment	21	25	27	32	27	27
Track	16	13	16	26	26	16
Other**	4	7	7	4	6	5
Unknown/Data Not Entered***	9	16	18	12	20	41

* to October 2005

** Other may include any of the following contributing factors: Environmental, Group/Organizational, Individual/Personal, or Other Workplace Factors

*** Unknown/Data Not Entered – contributing factor not yet determined

² Contributing Factors to rail derailments are grouped into four categories: 1.Track; 2.Equipment; 3. Other (may include any of the following: Environmental, Group/Organizational, Individual/Personal, Other Workplace Factors) and, 4: Not Determined/Unknown

Exhibits 3 and 4 show a breakdown of the contributing factors to CN Mainline Track Derailments by CN Region³. Derailments due to track are higher in CN's East Region compared to CN's West Region. Equipment is the predominant contributing factor in both Regions.

Exhibit 3 CN East – Contributing Factors to Mainline Track Derailments

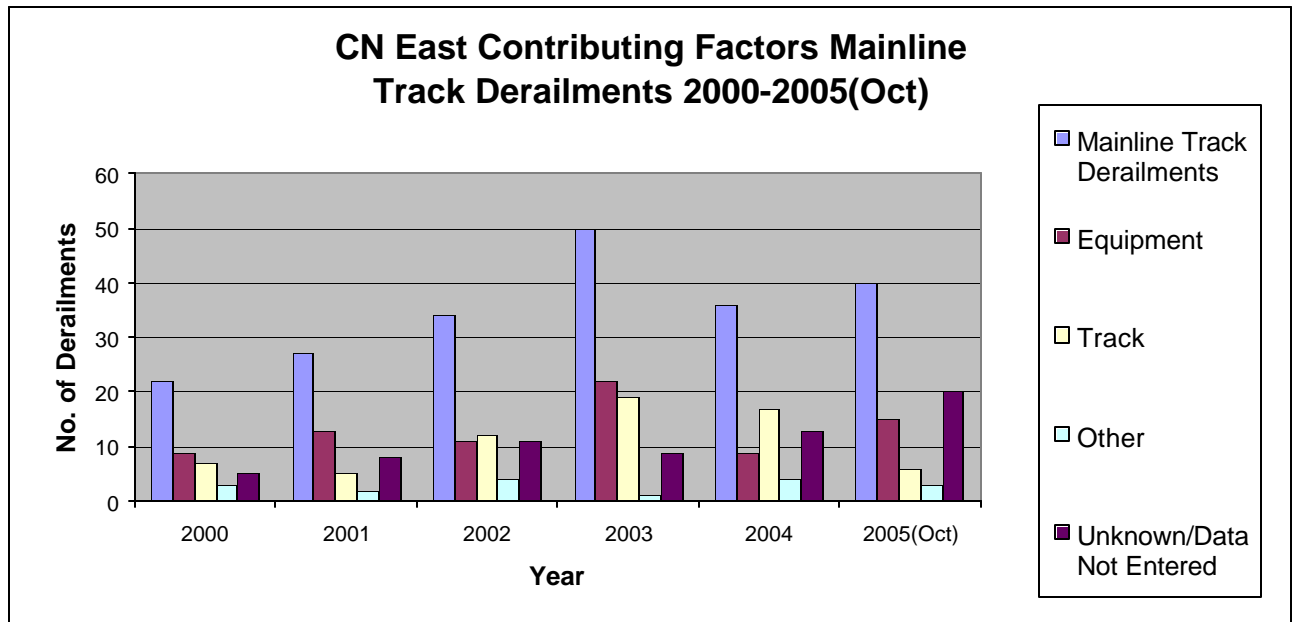
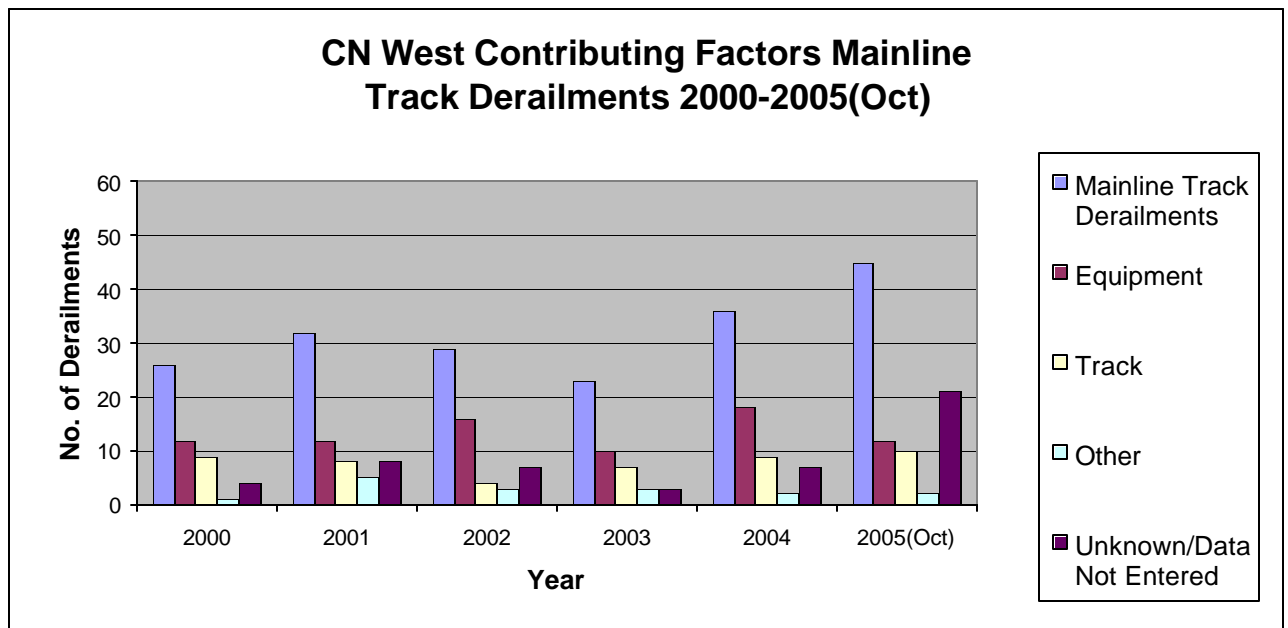


Exhibit 4 CN West – Contributing Factors to Mainline Track Derailments



³ CN East – from Armstrong, Ontario to Halifax N.S.
CN West – from Northwestern Ontario to the Pacific

3.0 TRANSPORT CANADA REGULATORY ACTIVITY

Under the *Railway Safety Act (RSA)*, Transport Canada promotes, monitors and enforces compliance with existing Rules, Regulations, Standards and General Orders. This includes inspections, audits, stakeholder consultation, safety education and awareness initiatives and complaint and incident investigations.

Also, Transport Canada undertakes inspections under the Canada Labour Code Part II, On Board Train Regulations (OSH).

This is accomplished through on going monitoring of railway equipment, operations, and engineering to determine levels of compliance with established requirements as set out in the legislation.

Should non-compliance to legislative requirements, or threats to safety be found, Transport Canada takes immediate enforcement action. Such action can include requesting the company to voluntarily correct non-compliances or implement adequate mitigating measures, or in the cases of immediate threats to safety, issuing a Notice and Order restricting the use of a railway work or equipment until the threat is removed to the inspector's satisfaction.

Failure by the railway to carry out obligations included in the Notice and Order can lead to prosecution action.

The results of the Rail Safety Directorate's on-going compliance monitoring activity directed towards CN over the last five years are summarized by program area in this section, followed by an outline of recent enforcement actions taken against CN.

Equipment Audit Program

The Rail Safety Directorate's Equipment Audit program includes:

- audits of various regulatory requirements pertaining to mechanical/equipment training, documentation, and processes and procedures; and,
- random-based inspections of rolling stock.

Between April 1, 2000 and August 15, 2005, Railway Safety Equipment Inspectors made 525 visits to CN to conduct audits and/or inspections. Visits ranged from one to five days in duration.

In that period, Railway Safety Equipment Inspectors found CN to have a 7.0% rate of overall non-compliance with program requirements pertaining to training, documentation, and processes and procedures.

An analysis of the results of rolling stock inspections for Locomotives and Freight Cars is provided below.

Locomotive Inspections

Between April 1, 2000 and March 31, 2005, Railway Safety Equipment Inspectors performed sampling inspections on 1, 174 CN Locomotives.

Following is a breakdown of the percentage of CN Locomotives inspected found to have specific safety defects⁴ over that period:

- 13% were found to have Safety Appliance defects (e.g., Loose sill steps, insufficient clearance of hand hold)
- 21% were found to have Suspension System defects
- 6 % were found with Draft Systems defects, and
- 55% were found with Cab/Car Body defects (relatively minor defects involving cleanliness or oily conditions)

Freight Car Inspections

Between April 1, 2000 and March 31, 2005, Railway Safety Equipment Inspectors performed sampling inspections on 12, 004 CN Freight Cars.

Following is a breakdown of the percentage of CN Freight Cars inspected found to have specific safety defects over that period:

- 9% were found to have Safety Appliance defects (e.g., Loose sill steps, insufficient clearance of hand hold)
- 11% were found to have Suspension System defects
- 3% were found with Draft Systems defects, and
- 3% were found with Car Body defects

The most significant equipment and operations-related safety concerns included:

Equipment

- the condition of the Rolling Stock - Locomotives and Freight Cars
- the process to conduct Train Brake Tests
- the quality of company Pre-Departure inspections
- the quality of Safety Inspections

⁴ Safety Defects – any condition that has the potential for causing a derailment, injury to a person, or property/environmental damage. These conditions can include a variety of items ranging from oily-dirty walkways/cabs and loose light bulbs, to suspension problems including broken bearings and brake shoes.

Operations:

- accuracy of consists
- pull-by Inspections
- securement of Equipment
- entraining/detraining of operating crew
- Canada Labour Code Part II, On Board Train Regulations (OSH) items

Engineering Program

The Engineering program includes audits and inspections of railway infrastructure including tracks, bridges, trespassing (access control), road crossings, railway signal systems and wayside safety devices.

Table 1 provides a summary of the estimated average annual number of railway infrastructure inspections carried out on CN infrastructure across Canada in the areas included in the scope of the targeted inspection activity (Part 2 of this report).

Table 1
Estimated Average Annual Number of Railway Infrastructure Inspections: CN Rail

Type of Inspection	Average Number Inspected Annually (Estimate)
Track	6,400 km (4,000 miles)
Crossings	
• Detailed	560
• Cursory (completed during track inspections)	2,000
• Cursory (completed during other inspections)	1,200
Crossing Warning Systems	
• Detailed	150
• Cursory	200
Train Traffic Control Systems	
• Detailed	600
• Cursory	30

As a result of the engineering inspections, federal railways are often requested to take corrective actions to address issues found during the inspections, and in many cases, orders restricting the speed of trains (i.e., slow orders) are applied.

The primary engineering-related safety concerns identified with CN are:

- inspection, testing and maintenance of track
- maintenance of Grade Crossings, including sightlines, signs, and surfaces
- inspection, testing, and maintenance of Crossing Warning Signals

4.0 TRANSPORT CANADA ENFORCEMENT ACTIONS

When identifying non-compliance with legislated requirements or safety issues, the Rail Safety Directorate seeks first to achieve Voluntary Compliance - actions taken by a railway to correct/address the non-compliance or safety issue.

Where there is a situation that can lead to a threat to safety, or where a Railway Safety Inspector has identified an Immediate Threat to Safety, a Notice, or a Notice & Order may be issued to the railway company.

Notices and Orders

Table 2 shows the numbers of Notices, and Notice & Orders (often referred to as Orders) that have been issued to CN since 2000.

Table 2: Notices, and Notices & Orders Issued to CN: 2000 – 2005 (October)

		Crossing	Trespassing	Infrastructure	Equipment	Operations	TOTAL
2000	<i>Notices</i>	10	0	0	3	6	19
	<i>Orders</i>	0	0	0	1	2	3
2001	<i>Notices</i>	13	0	1	3	5	22
	<i>Orders</i>	4	1	0	5	4	14
2002	<i>Notices</i>	9	0	3	2	7	21
	<i>Orders</i>	6	0	3	1	2	12
2003	<i>Notices</i>	2	0	5	3	4	14
	<i>Orders</i>	6	1	4	0	2	13
2004	<i>Notices</i>	3	0	3	3	2	11
	<i>Orders</i>	2	0	3	0	2	7
2005	<i>Notices</i>	7	0	6	5	5	23
	<i>Orders</i>	1	0	0	4	3	8
TOTAL	<i>Notices</i>	44	0	18	19	29	Notices 110
	<i>Orders</i>	19	2	10	11	15	Orders 57
GRAND TOTAL		63	2	28	30	44	167

Prosecutions

The Attorney General of Canada has laid charges against CN seven times in the last ten years for violations of the *Railway Safety Act (RSA)*. On four of these occasions, CN was convicted and fined. CN was acquitted in one case. Two cases are currently before the courts.

Table 3 presents a brief description of the prosecution actions taken against CN under the *RSA*. Additional details are available from Justice Canada.

Table 3
Prosecution Actions Taken Against CN Under the RSA

Year	TC Region	Description	Result/Status
1997	Pacific	CN violated a <i>RSA</i> Section 31 Notice and Order restricting rail movement speed over a public crossing at grade to 10mph because of unsafe track conditions.	Convicted Fined - \$5K
1999	Pacific	CN was prosecuted for blocking a crossing in non-compliance of Canadian Railway Operating Rule (CROR) 103c. The conductor pleaded guilty and was assessed a fine, corporate CN was released by the judge.	Not Guilty
1999	Pacific	CN violated a <i>RSA</i> Section 31 Notice and Order prohibiting CN from storing railway equipment on a track without positive protection to prevent uncontrolled movements.	Convicted Fined– \$7.5K
2002	Ontario	CN pleaded guilty in court to violations of a <i>RSA</i> Section 31 Notice and Order relating to incomplete communications about railway track switch positions.	Convicted Fined - \$80K
2005	Pacific	CN pleaded guilty under section 11 of the <i>RSA</i> to omissions with respect to record keeping that are inconsistent with sound engineering principles in the evaluation of a railway line work such as a Bridge	Convicted Fined - \$75K
2005	Ontario	CN is presently being prosecuted for operating trains on track with unsafe conditions. Multiple charges have been laid and are before the court.	On-going
2005	Quebec	CN is presently being prosecuted for violation of a <i>RSA</i> Section 31 Notice and Order for not obeying a slow order issued because of unsafe track conditions.	On-going

PART 2

RESULTS OF TARGETED INSPECTION ACTIVITY

1.0 INTRODUCTION

Rail Safety Inspectors across Canada conducted targeted inspections of CN operations over the four-week period from August 22, 2005 to September 16, 2005. Follow-up inspections at specific sites were subsequently conducted from September 19 to 23, 2005.

Planned inspection activities were prioritized based on Transport Canada identified safety concerns/issues with CN stemming from the on-going Regulatory Activities of the Rail Safety Directorate. Some aspects of the Rail Safety Oversight program - e.g., trespassing and access control, bridge infrastructure - were not included due to the focused nature of the targeted inspection activity.

Weekly inspection/enforcement summaries were provided by Railway Safety Inspectors and consolidated by function at Transport Canada Headquarters.

An initial meeting was held with a CN representative on August 19, 2005 with an interim briefing provided to CN Executives on September 1, 2005. CN Executives were briefed on the final results of the four-week targeted inspection activity on September 27, 2005. CN submitted Corrective Actions to Transport Canada on October 11, 2005 as requested.

This Part of the report outlines the findings of Transport Canada's targeted inspection activity by function (Equipment, Operations, Occupational Health & Safety, and Engineering) and presents CN Corrective Actions.

2.0 RESULTS BY FUNCTION

EQUIPMENT

The results of the equipment inspections are presented as Freight Car and Locomotive Safety Defects. As indicated earlier, a Safety Defect is any condition that has the potential for causing a derailment, injury to a person, or property/environmental damage. These conditions can include a variety of items ranging from relatively low-risk concerns (e.g., loose light bulbs) to higher-risk items (e.g., car-suspension problems). As part of the development of the relevant Safety Rules in 1994, railway companies identified the types of conditions included as a "Safety Defect".

Freight Car Overview

Over the targeted inspection period, Rail Safety Inspectors performed a physical examination of railway equipment to identify any component condition that prevents the proper design function of the component or creates a hazard. An overall safety defect rate of 20.6% of the 3,021 freight cars inspected was identified. The weekly freight car safety defect rates ranged from 12.7% to 27.0%.

Following is a listing and brief description of examples of equipment defects that were identified with the greatest frequencies during the targeted inspection activity. In all cases, Rail Safety Inspectors issued Equipment Program Reports (i.e., letters of non-compliance) to CN officials requiring the company to voluntarily take actions to correct/address the non-compliance or safety issue within 14 days. None of the conditions identified represented a threat or immediate threat to safety, by itself. The Rail Safety Directorate is working with CN on systemic corrective actions to reduce the occurrence of these defects (see Part 2, Section 3.0 CN Corrective Actions).

1. Safety Appliance Defects - 151 defects identified

- **Loose Sill Steps** - 28 occurrences
- **Insufficient clearance of hand hold** - 23 occurrences

These conditions can cause a medium risk to personal injury, loss of life or loss of limb, and under the right conditions, a derailment or damage to property or environment.

2. Foundation Brake Gear Defects – 145 defects identified

- **Missing bottom rod safety support*** - 60 occurrences
- **Broken bottom rod safety support*** - 24 occurrences
- **Defective brake beam** - 24 occurrences

These related conditions can cause an ineffective brake on a car, or cause a condition of dragging equipment. They have been identified as contributing factors to derailments. These conditions create a medium to high risk for derailment, personal injury or damage to property or environment.

* Missing or broken bottom rod supports are currently not included in the listing of safety defects in the Freight Car Inspection and Safety Rules. However, due to concerns raised by the Transportation Safety Board and Transport Canada, these items warrant consideration as falling under the safety defect category.

3. Suspension System Defects – 125 defects identified

- **Loose backing ring** - 26 occurrences

This condition is considered a medium risk for derailment, personal injury or damage to property or environment.

- **Broken side bearing** - 20 occurrences

A broken side bearing may cause a “rock and roll” effect on a car. Depending on the severity, this condition creates a low to medium risk for derailment, personal injury or damage to property or environment.

4. Draft Systems Defect – 115 defects identified

- **More than 25% of center plate fasteners loose** - 23 occurrences

This condition may cause cars to separate from the truck. This condition creates a low to medium risk for derailment, personal injury or damage to property or environment.

5. Defects with Car Bodies – 60 defects identified

- **Unsecured plug type door** - 27 occurrences

The loss of this door on a train in transit has in the past caused the loss of life. This condition causes a medium to high risk for derailment, personal injury or damage to property or environment,

- **Broken coupler knuckle pin** - 22 occurrences

This condition has the potential to cause incidents ranging from a coupler knuckle falling on the foot of an employee to a train separation. This condition creates a low to medium risk for derailment, personal injury or damage to property or environment.

During week one of the targeted inspection activity period, Transport Canada Railway Safety Inspectors identified two significant Equipment-related safety concerns:

- Train Brake Inspections – incorrect process used by CN operating crews performing air brake tests
- Certified Car Inspections – CN mechanical personnel improperly performing safety inspections

CN immediately took the following corrective actions to address these safety concerns to the satisfaction of Transport Canada:

- CN introduced a revised formal brake testing and documentation process for train crews
- CN suspended safety inspections performed from moving vehicles by mechanical personnel and are now conducting these inspections on foot

One enforcement action was taken in the Equipment Program during the targeted inspection activity to address an identified threat to safety involving the movement of cars with safety defects.

Enforcement Action	Date	TC Region	Description
Notice & Order	Sept. 2	Pacific	Location: Prince George, Quesnel and Williams Lake terminals. CN Ordered to take steps to improve car inspections: High number of cars with Transport Canada Safety Defects.

Locomotive Overview

The inspections identified a safety defect rate of 53.9% of the 232 locomotives inspected over the four-week activity period. The weekly locomotive safety defect rates ranged from 32.4 % to 68.9%.

Although the sample size was small and most of the defects were found on “other than the main line heavy haul locomotives”, there was a significantly high rate of safety defects on locomotives operating in rail yards and at outlying locations.

Following is a listing and brief description of examples of locomotive defects that were identified with the greatest frequencies during the targeted inspection activity.

1. Foundation brake gear defects – 86 defects identified and Air Brake Defects – 28 defects identified

- **Misaligned Brake Shoe** - 60 occurrences
- **Brake beam head worn** - 15 occurrences
- **Excessive brake piston travel** - 12 occurrences

These three conditions are indications of poorly maintained truck braking systems. Each of these defects as a stand-alone creates a low to medium risk for derailment, personal injury or damage to property or environment, dependent on the type of locomotive and the service in which the locomotive is operating.

2. Combustible materials – 72 defects identified

- **Excessive accumulation of oil on exterior of locomotive** - 26 occurrences
- **Excessive accumulation of oil on the exterior of fuel tank** - 13 occurrences

These two related defects are an indication of poor maintenance of locomotives and in some circumstances (e.g., oil on running boards) have the potential for loss of employee footing. Each of these defects as a stand-alone creates a low to medium risk for personal injury or damage to property or environment (fire). The continued accumulation of the combined defects creates a medium risk, dependent on the type of locomotive and the service (speeds) in which the locomotive is operating.

- **Insufficient uncoupling lever assembly clearance** - 15 occurrences

This condition can cause separation of a locomotive from cars with potential for cars to roll back uncontrolled into the locomotive, or into or out of a yard. It represents a medium risk for derailment, personal injury or damage to property or environment, dependent on the type of locomotive and the service (speeds) in which the locomotive is operating.

OPERATIONS

Over the period of the targeted inspection activity, the Rail Safety Directorate identified a high rate of violations for inaccurate consists and for failing to apply appropriate hand brakes to stationary cars.

1. Inaccurate Consists – 14% violation rate

Of the 103 trains verified, 14 % were found to be inaccurate as to the positioning of cars or the addition of a car to a train that was not indicated on the train consist.

In the event of a vehicle/train collision or a derailment, first responders, railway employees and the public can be placed in danger if a car carrying dangerous goods is involved and the car is not indicated to the first responders. This in turn creates a medium to high risk for personal injury or damage to property or environment.

2. Securement of Equipment (CROR 112) – 21% violation rate

Twenty-one per cent of the 206 tracks monitored in yards included cars in violation of the Canadian Railway Operating Rule 112 (requirement for applying hand brakes) or to CN's Special Instructions on this requirement.

This requirement was put in place in 1994 following a collision of runaway cars and a freight train in which there were three fatalities. This condition has been the cause of previous derailments and incidents and creates a medium to high risk for derailment, personal injury or damage to property or environment.

A breakdown of the number of violations identified for inaccurate consists and for failing to apply appropriate hand brakes to stationary cars (Rule 112) by Transport Canada Region, is shown in Table 4.

Table 4
Number of Consist Verification and Rule 112 Violations by TC Region

Transport Canada Region	Number of Violations	
	Consist Verification	Rule 112
Pacific	10	9
P&NR		13
Ontario		25
Quebec	3	3
Atlantic	1	

3. Exemption on Pull-by Inspections - no violations

4. Entraining or Detraining of operating employees – no violations

The following enforcement actions were taken in the Operations Program during the targeted inspection activity (August 22 – Sept. 16) to address identified threats to safety:

Enforcement Action	Date	TC Region	Description
Notice and Order	Sept 13	Pacific	Inspectors performed a comparison of 5 transfer journals and the corresponding AEI (Automatic Equipment Identification) reader printouts. All 5 transfer movements were operating with improper or incomplete train documentation.
Notice and Order	Sept 14	Headquarters	Continued train documentation errors including the presence of additional cars not indicated on train journals. Additional cars can include dangerous goods cars.
Notice	Sept 16	Prairie and Northern	Remote control transfer movements in non-compliance with the Canadian Railway Operating Rules. Transfer movements made in violation of industry-wide accepted rules.

Subsequent to the targeted inspections (August 22 – Sept. 16), CN experienced derailments in Transport Canada’s Pacific Region in October/November 2005. The following enforcement actions were taken to address identified threats to safety with CN’s train operations.

Enforcement Action	Date	TC Region	Description
Notice and Order	Oct 27	Pacific	CN was ordered to restrict certain freight train operational activities in the Squamish, B.C. area.
Notice and Order	Nov 4	Pacific	CN was ordered to limit the length of conventional trains operating northbound between Squamish and Clinton to 80 cars and conduct detailed simulations regarding distributed power trains that operate in the Squamish area.
Notice and Order	Dec.6	Pacific	CN was ordered to limit the length of both conventional and distributed power trains operating as above to 80 cars
Notice and Order	Dec. 14	Pacific	TC imposed a number of conditions on all CN northward trains operating between North Vancouver and Lillooet B.C.

Transport Canada’s Rail Safety Directorate, in conjunction with the Department’s Transportation Development Centre, is currently conducting an information review on operation of long trains. The intent is to develop terms of reference for a research initiative describing safety impacts/industry best standards/practices associated with long train operation.

OCCUPATIONAL HEALTH & SAFETY

Railway Safety Inspectors found 37% of the locomotives inspected to have violations to the Canada Labour Code Part II, On Board Train Regulations. Following is an overview of the violations found:

- **No/out of date fire extinguishers**
- **No/incomplete first aid kits**

These conditions create a low to medium risk of personal injury or damage to property or environment.

- **Missing sun visor** - 12 occurrences

Seemingly a minor defect, but the lack of a sun visor can restrict locomotive engineer vision, which could contribute to the collision with a vehicle, an employee, or a private individual. This condition causes a medium risk for derailment, personal injury or damage to property or environment, dependent on the type of locomotive and the service (speeds) in which the locomotive is operating.

- **Missing protective cover on electrical equipment** - 12 occurrences

This condition causes a medium to high risk for personal injury.

A total of 96 Advisories of Voluntary Compliance (AVC) were issued during the four-week targeted inspection activity in the following areas: Belleville, Lynn Creek and North Van, Glen Yard, Squamish, Water Front yard, Smithers, Prince George, Moncton (Direction Issued) and Regina.

A summary report of the inspection activities undertaken and results for the Equipment and Operations functions is provided in Table 5.

Table 5.

CN Safety Review Report / Rapport d'évaluation de la sécurité au CN

Activity /Activité	Week/Semaine 1			Week/Semaine Week 2			Week/Semaine Week 3			Week/Semaine Week 4			Total			Average Defect Rate
	Units/ Unités			Units/ Unités			Units/ Unités			Units/ Unités			Units/ Unités			
	U	U - D	TD	U	U - D	TD	U	U - D	TD	U	U - D	TD	U	U - D	TD	
Freight Car Inspection	965	202	268	733	198	273	420	77	133	782	139	197	3021	621	879	21%
Locomotive Inspection	80	43	137	61	42	125	52	26	62	37	12	30	230	123	154	53%
Quality / Safety Inspection (Car)	16	13	13	18	12	12	1	1	1	2	0	0	37	26	26	70%
Quality/Safety Inspection (Loco)	0	0	0	0	0	0	6	0	0	3	0	0	9	0	0	0%
Safety Inspector Training	16	13	13	12	1	1	8	0	0	6	0	0	38	14	14	37%
Train Brake Test	4	3	3	3	2	2	10	5	5	9	3	3	26	13	13	50%
Locomotive Brake test	12	0		14	1		12	0	0	2	0	0	40	1	N/A	3%
Monitoring of OSH Genset Dir.	0	0	0	0	0	0	0	0	0	8	0	0	8	0	N/A	0%
Consist Verification	28	4	4	28	3	3	23	5	2	24	2	2	103	14	14	14%
Pull-by Inspections	4	0	0	2	0	0	5	0	0	28	0	0	39	0	0	0%
Securement of Equip CROR 112	89	23	23	43	4	4	54	15	15	20	5	5	206	47	47	23%
Entraining / Detraining	38	0	0	36	0		52	0	0	19	0	0	145	0	0	0%
Condition of Locomotive (OSH)	34	13	13	29	12	12	53	10	13	56	29	34	172	64	69	37%
Appendix I inspect. by Train Crew	0	0	0	9	0	0	3	0	0	3	0	0	15	0	0	0%
Train Brake Test By Crew **	9	1	0	5	2	0	2	0	0	8	0	0	24	3	N/A	13%
Locomotive Brake test By Crew	2	1	1	1	0	0	6	1	1	5	0	0	14	2	2	14%

U = Units

U-D = Units with Defects

D = Number of defects

U = Unités

U-D = Unités avec défauts

D = Nombre de défauts

ENGINEERING

Table 6 shows the weekly results of the targeted engineering inspections in the following areas:

- Track
- Automated Crossing Warning Systems
- Grade Crossings

Following is an overview of the key findings in each of these areas:

Track

A track inspector or track supervisor from CN accompanied a Transport Canada Rail Safety Inspector during hi-rail inspection trips over 35 subdivisions. Appropriate remedial action was taken on items found that required immediate attention. Where repairs could not be made prior to the arrival of the next train or where the deviations extended over a long distance, temporary slow orders were applied. The safety concerns and deviations to the Track Safety Rules have been summarized into the following categories:

Deficiencies and safety concerns related to bridges – A total of 9 items were recorded over 8 subdivisions. The items ranged from safety concerns consisting of loose handrails to deviations to the Track Safety Rules such as low approaches to the bridge and ballast leaking at the dump wall. Loose handrails can lead to employee injuries while low approaches and leaking ballast at a dump wall can lead to a derailment if not attended to in a timely manner. CN took appropriate remedial action on all identified items.

Non-compliance related to vegetation – There were 27 locations over 16 subdivisions where there was non-compliance to the Track Safety Rules. The locations identified ranged from obstruction of signs, to interference with railway employees performing normal trackside duties, to having combustible debris around bridges. The risk of train crews missing a sign, the risk of damage to a bridge in the event of a fire and the risk of a track inspector missing a defect due to the obstruction, create the potential for an accident if left unattended. CN took appropriate remedial action on all identified items.

Non-compliance related to cross ties – There were 22 items of non-compliance with the Track Safety Rules over 13 subdivisions during the targeted inspections. Wide-gauge, clusters of defective ties, improper support under joints were among the deviations found in wood tie sections of track. All of these conditions create a risk of a derailment if left unattended; however, appropriate remedial action was taken by CN on these items. The Nechako, Letellier, Val d'Or & St. Maurice subdivisions required temporary slow orders.

In concrete tie territory, rail seat abrasion on tangent track is a major concern that needs to be addressed.

Deviations related to track geometry – There were 8 locations on 2 subdivisions where deviations to the Track Safety Rules on cross-level and surface profile were found. Where these exist there is a risk of a derailment. CN took appropriate remedial action to address these deviations.

CN's track geometry car inspection results from seven subdivisions (20%) of the 35 reviewed, showed a high number of locations where track conditions are in non-compliance with the Track Safety Rules. The deviations found required speed restrictions. They develop between track geometry car inspections and the track falls below the Track Safety Rules undetected until the next track geometry car inspection takes place. Trains operate over these deviations at track speed until they are detected. This poses a risk of a derailment at locations where the deviation remains undetected and trains continue to operate. The high number of deviations found on some subdivisions indicates that the track is not being adequately maintained between track geometry car inspections to keep the track from falling below the Track Safety Rules.

Deficiencies related to ballast – There were 43 items of non-compliance to the Track Safety Rules found over 8 subdivisions that involved fouled ballast, mud pumping and areas where there is insufficient ballast to support the track. Although most of these locations do not show deviations during track geometry car inspections, they are in non-compliance to the Track Safety Rules and, if left unattended, they have the potential to lead to a derailment. Of the subdivisions identified through the targeted inspections Drummondville, Joliette, Ruel, Albreda and Edson were of most concern.

Safety concerns and issues related to rail defects – There were 14 items related to rail issues found over 7 subdivisions. They ranged from damaged rail, to rail wear. Rail defects left in the track undetected present a risk of breaking out under a train with the potential of causing a derailment. CN took appropriate remedial action on the 14 rail defects and the damaged rail that were found.

Rail wear is a concern. There are several locations where rails worn beyond wear limits are still in track. Although CN allows this to occur under the direction of the Division Engineer, rail worn beyond wear limits can be unpredictable and its condition can deteriorate rapidly.

The results from the rail flaw detector car inspections show a high number of internal rail defects in the following subdivisions: Val d'Or; Lac St. Jean; Carbery; Cromer; Letellier; St. Maurice; Westlock; and, Soo. While CN's testing frequencies on these subdivisions meet minimum Track Safety Rule requirements, the rules obligate CN (and all Railways) to undertake inspections at such frequency and method to ensure that a line of track is safe for operation of a train at the authorized track speed. Many of these internal rail defects develop and grow to a point where they require speed restrictions and yet remain in the track undetected while trains continue to operate at track speed. While these rail defects remain in track undetected, they pose a risk of breaking out under a train causing a derailment. The high number of internal rail defects found questions whether rail is being managed properly on those subdivisions.

Non-compliance related to Joints – There were 20 items identified related to joints that were not in compliance with the Track Safety Rules over 13 subdivisions. These items ranged from missing bolts to cracked splice bars. Appropriate remedial action was taken by CN to address the deficiencies found. These deficiencies, if left unattended, have the potential to cause a derailment. Temporary Slow orders were applied to the Bulkley and Joliette subdivisions due to cracked joint bars.

Non-compliance related to Rail Anchoring – There were 8 items identified that were not in compliance with the Track Safety Rules found over 4 subdivisions where there were insufficient rail anchors or rail fasteners. Both of these situations have the potential to lead to a derailment if left unattended. Remedial action was taken by CN on identified items.

Non-compliance related to Turnouts – There were a total of 55 items over 19 subdivisions found during the targeted inspections related to turnouts that were not in compliance with the Track Safety Rules. The deviations range from loose or missing bolts to chipped points or chipped frogs to high defective tie counts throughout the turnout. Many of these items have the potential to cause a derailment if left unattended. Appropriate remedial action was taken by CN on those deviations found.

Non-compliance related to Track Inspections – There were 13 track inspection infractions noted over 9 subdivisions. They ranged from failure to keep records, to failure to note remedial action taken for defects found, to failure to complete mandatory inspections. Failure to keep records can lead to poor decision making in critical situations where that information is needed. Failure to note remedial action taken questions whether appropriate action has been taken to address the defect found. Failure to complete required inspections may lead to defects being left in the track, which could cause derailments.

There were several issues raised during the targeted inspections regarding the ability of CN track inspectors to carry out thorough inspections on some subdivisions. Available track time to complete inspections properly is a concern on some territories. The track inspector is often taken away from his regular inspections due to other activities such as training, meetings, special inspections for hot and cold weather, high water, rock falls, mudslides, rough track reports from train crews and other unscheduled events. Several employees, such as track foreman, track maintainer or lubricator maintainer, are sometimes required to complete mandatory inspections because the track inspector is involved in other activities. Several different employees performing portions of the mandatory inspections required by the Track Safety Rules can lead to inconsistency and confusion in record keeping and tracking.

Prior to major track rehabilitation programs or when major track rehab programs are deferred, track inspectors often need more time to inspect track to monitor conditions that

are bordering on non-compliance with the Track Safety Rules. The track also requires increased maintenance during that timeframe. On some territories the track inspectors supervise employees and maintenance work.

Deficiencies related to Crossings – There were 72 items found over 18 subdivisions related to crossings. They ranged from improper location of signs, to poor surface conditions, to inadequate sightlines. All have the potential to cause accidents if left unattended. Appropriate remedial action was taken to address these items.

Safety concerns related to Other Items – There were 21 locations over 8 subdivisions where Other Items were identified as safety concerns. These ranged from trespassing to surface defects in rail to poor insulated joints. All have the potential for an accident or injury if left unattended. Appropriate remedial action was taken by CN on all these items.

Track related Slow Orders were applied on the following locations:

Subdivisions	Number of track-related Slow Orders
Bulkley	1
Joliette	1
Letellier	1
Nechako	2
St. Maurice	2
Val d'Or	1

Crossings

Inadequate sightlines - Inadequate sightlines at crossings was the most serious item found during the inspection of 913 crossings on CN track. 26 % of the crossings inspected had inadequate sightlines – the majority of these at unprotected crossings. They accounted for 28 temporary slow orders that were applied as a result of the inspections. Inadequate sightlines have the potential to contribute to crossing accidents.

Surface conditions - Poor surface condition was the next most serious item found during the inspection of crossings. This item appeared as a safety concern on 20% of the crossings inspected. Surface conditions ranged from worn or loose planks, to inadequate flange width or depth, to excessive vertical movement due to poor support of the crossing surface. A poor crossing surface can slow a vehicle's passage or even cause a low-bed type vehicle to get hung-up, resulting in the possibility of an accident. In the case of poor flangeways, there is the possibility of an accident occurring if a wheelchair or bicycle wheel gets caught in it.

Signs - Poor signage conditions relating to signage under CN's responsibility , were identified at 20% of the inspected crossings. Poor sign visibility may not provide adequate warning to motorists using the crossing.

Automatic Crossing Warning Systems

Of the 161 automatic crossing warning systems inspected the following are considered systemic issues:

Plans – 60 % had deficiencies related to plans. The deficiencies include illegible plans due to weathering, poor conditions, or excessive marking-up. Although these deficiencies do not pose a high risk of causing an accident, Transport Canada takes them seriously as they are indicative of deficiencies in CN's internal practices and procedures.

Light alignment coordinates – 30 % had deficiencies in light alignment coordinates. In most cases, the coordinates were not available at the site. It is important that the lights are aligned to the coordinates. Failure to position lights as designed creates a risk of an accident occurring if an oncoming motorist does not observe the light in a timely manner.

Insulated Joint condition – 27% had defective insulated joints due to worn or missing insulation or rail condition. This could lead to interference with the signal system. Although not an immediate threat, Transport Canada considers this a serious deficiency.

Light Unit alignment – 31% had one or more lights misaligned. This is serious as a motorist may not get adequate warning when approaching a crossing if a light or lights are misaligned.

Table 6

GRADE CROSSINGS	# of Grade Crossings Inspected	# of Grade Crossings with a non-compliance(s)	# of non-compliances per element			# of Slow Orders applied	# of problems addressed through other means
			Surface	Sign	Sight Lines		
Week 1 (August 22-26)	209	99	30	30	66	1	4
Week 2 (August 29-Sept 02)	280	170	128	66	77	23	31
Week 3 (Sept 05-09)	168	104	53	52	38	1	14
Week4 (Sept 12-16)	256	126	83	36	60	3	8
Totals	913	499	294	184	241	28	57

TRACK	# of Subdivisions Inspected	# Miles Track Inspected	# of non-compliances to Track Safety Rules			# of Slow Orders applied	# of other means taken to address identified problems
			Deviations to track standards	Rail defects	Performance issues		
Week 1 (August 22-26)	12	593.3	45	9	26	2	15
Week 2 (August 29-Sept 02)	7	418.2	68	0	9	5	5
Week 3 (Sept 05-09)	6	353.91	31	4	29	1	6
Week4 (Sept 12-16)	10	617.41	148	7	27	0	9
Totals	35	1982.82	292	20	91	8	35

Automatic Crossing Warning Systems	# of Crossings Inspected	# of Crossings with deficiencies	# of systemic problems identified	# of deficiencies associated with systemic problems	# of deficiencies not associated with systemic problems	Total number of deficiencies identified	# of problems addressed
Recent inspections conducted as part of the random sampling list program	65	62	4	119	136	255	255
Week 1 (August 22-26)	17	17	5	32	41	73	73
Week 2 (August 29-Sept 02)	25	25	6	58	52	110	110
Week 3 (Sept 05-09)	22	22	6	60	121	181	181
Week4 (Sept 12-16)	32	29	5	47	56	103	103
Totals	161	155	26	316	406	722	722

During the targeted inspection activity (August 22 – Sept. 16), Transport Canada Rail Safety Inspectors provided Engineering Inspection reports to CN officials requiring the company to voluntarily take actions to correct/address non-compliance or safety issues within 14 days. In addition, the following enforcement actions were taken in the Engineering Program to address identified threats to safety:

Enforcement Action	Date	TC Region	Description
Notice	Sept 2	Atlantic	<p>Location: Mile 46.90 Springhill Subdivision</p> <p>A number of switch machines failed the quarter inch obstruction test. Fouled ballast in the switch point area created pumping action & vertical movement of the switch point. The movement affected the adjustment between the switch point and switch machine resulting in the potential failure of the signal system to detect open points.</p>
Notice	Sept 9	Prairies & Northern	<p>Location: Mile 14.80 to 36.2 Letellier Subdivision</p> <p>Poor joint maintenance, defective tie conditions, deficiencies in record keeping and failure to initiate remedial actions as required. Progressively deteriorating condition.</p>
Notice and Order	Sept 14	Pacific	<p>Location: Mile 71.94 Yale Subdivision</p> <p>Inappropriate flagging activity. The flagging person from a contractor working close to a work site caused road vehicles to stop at or close to a protected railway crossing.</p>

3.0 CN CORRECTIVE ACTIONS

CN cooperated in all aspects of Transport Canada's targeted inspection activity. When requested, CN acted promptly in addressing identified safety concerns and providing corrective actions.

The results of the targeted inspection activity were presented to CN Executives on September 27, 2005. CN was requested to submit to Transport Canada required Corrective Actions in each functional area.

CN's proposed Corrective Actions were received on October 11, 2005 as requested. Table 7 shows CN's Corrective Actions with corresponding comments from Transport Canada.

Also, at the September 27 meeting with CN officials, Rail Safety Directorate officials expressed concerns about the high number of Track Safety Rule non-compliances that CN finds when testing track with the Track Geometry Car, specifically on the Kingston Subdivision. CN investigated these further and applied temporary slow orders for passenger trains at the following locations in the Kingston Subdivision:

<u>Track</u>	<u>Slow Order Limits</u>
North	mile 133 – 161
North	mile 188 – 213
North	mile 230 – 239
North	mile 265 – 281
North	mile 300 – 315
South	mile 123 – 162
South	mile 188 – 213

CN Rail has also undertaken other initiatives to reduce the number and severity of mainline track derailments including:

- Re-spacing wayside inspection network to a 15-mile standard on the mainline and the addition of five additional wheel impact load devices
- Software to develop early warnings of developing brake, wheel, and bearing issues
- Increasing the frequency of ultrasonic rail flaw detection and track geometry inspection
- Purchasing three hi-rail mounted track geometry test vehicles to increase testing on secondary and industrial lines
- Purchasing three portable ultrasonic rail testers to test rail inventories, industrial leads and yard trackage
- Installation of a new state of art rail traffic control system
- Committing significant capital funding to basic plant maintenance and upgrading
- Reorganization of the Network Engineering group
- Bringing locomotive management under Network control with a view to ensuring maintenance and inspection requirements are met

Table 7
CN Action Plan
Equipment and Operations

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
1. Freight Car Defects - Detailed action plan and internal audit process	<ul style="list-style-type: none"> • Freight Car Inspection Refresher Training tutorial to be reviewed by All Supervisors and Carmen across Canada – Approx. 900 people completed by end of October 2005. • All CN field Supervisors will audit car inspections and record results in PMRC system for analysis and record keeping (minimum 100 cars per month). <ul style="list-style-type: none"> ❖ Use of PMRC system requires Supervisors to detail remedial actions including providing feedback and coaching to the Carmen when defects are found. • CN HQ Mechanical personnel to audit car inspections at field locations and will also record results in PMRC system for analysis and record keeping (minimum 100 cars per month). Results will be reviewed with Supervisors and Carmen. PMRC process requires feedback and coaching to be provided to Supervisors and Carmen based on defects found. • Monthly scorecard on results to be prepared by HQ Mechanical. This will identify any areas requiring further training or focus. • Joint audits will be conducted between TC and CN HQ Mechanical quarterly. • Continue to repair cars to AAR standards when cars are at Speedy Repair Tracks and when performing yard repairs. Continue to expand our network detector systems across Canada Eg: 3 new WILD detectors in 2005. 	<ul style="list-style-type: none"> • Given the seriousness of the recent CN Rail accidents and the level of data trends, Transport Canada (TC) believes CN's action plan pertaining to Equipment matters must be more comprehensive. The action plan to address Freight Car and Locomotive defects consists of a number of practices that were in place before TC's targeted inspection activity. TC is not satisfied that continuing with existing measures alone will effectively address the non-compliances found during the targeted inspection activity. CN must develop more detailed action items to augment these measures, e.g. adopt a formal periodic re-qualification process as part of the Freight Car Inspection re-fresher training. • TC believes that the proposed joint TC and CN HQ Mechanical audits will lead to better communication and enhanced understanding of roles, and is satisfied that the installation of detectors is a positive step.

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
2. Locomotive Defects - Detailed action plan and internal audit process	<ul style="list-style-type: none"> • Low horsepower locomotives will be cycled to a shop for inspection at 92 day intervals. • Accelerate truck replacement program by adding 4 additional trucks to pool. Truck upgrade program is in place at Symington, Walker, and Thornton shops. • CN HQ Mechanical personnel to audit Locomotives at field locations and record results in PMRC system for analysis and record keeping (minimum 4 Locos per month) • CN field supervisors to audit Locomotives and record results in PMRC system for analysis and record keeping (minimum 4 Locos per month) . Monthly scorecard to be prepared by HQ Mechanical. 	<ul style="list-style-type: none"> • TC believes the accelerated truck replacement program is a good first step, but notes that timelines are not provided. Also, preventative maintenance programs are required to prevent the locomotive trucks from deteriorating to their present condition. The measures taken to enhance tracking in PMRC are seen as an improvement.
3. Occupational Health and Safety - Detailed action plan and internal audit process	<ul style="list-style-type: none"> • Action plan is being developed to have field staff perform general servicing at 7 day intervals at all line point locations. • General servicing supplies will be available at all line point locations. • Refresher training will be conducted at all servicing locations 	<ul style="list-style-type: none"> • While these are good measures, TC believes that a re-qualification program as part of CN Rail's refresher training is required to address Canada Labour Code Part 11, On Board Train Regulations.

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
4. CROR 112 (Securing Railway equipment) - Detailed action plan and internal audit process	<ul style="list-style-type: none"> • Will initiate efficiency test blitz on System: specific no. of tests per Supervisor • Geographic area with most TC identified issues to be blitzed by System Audit team • Formal corrective action with errant crews to be undertaken • Visit need for Handbrake chart with TC/define 'sufficient' • Efficiency tests and PMRC record to be used to identify trends by area and employee. 	<ul style="list-style-type: none"> • TC is satisfied with these actions and believes that the results of efficiency tests by supervisors will indicate levels of success.
5. Inaccurate consists - Detailed action plan and internal audit process	<ul style="list-style-type: none"> • As an interim measure, Yardmasters are now certifying accuracy of outbound consists prior to departure, and retaining records. • Making systems and process changes to use the same AEI/Consist comparison for transfers, as is done for trains. (ETA 15 October) • Have established dedicated monitors to flag added starters in AEI system at the main reporting hubs. • Local procedures are in effect to ensure root cause analysis and follow up on instances of improper documentation. • Developing reporting package from Data Ware house to allow for timely internal auditing – knowing where, when, and circumstances of failures will allow management to determine if field process worked, and if root cause was determined and addressed. 	<ul style="list-style-type: none"> • TC believes train and transfer movement accuracy should improve as a result of these initiatives, and notes that time lag between departure of a train and verification by the Automatic Equipment Identification (AEI) system on the outskirts of a terminal must be improved. TC reminds CN of the requirement to comply with all aspects of the current Order.

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
6. CROR Revisions for Transfer Movements - Detailed action plan and internal audit process	<ul style="list-style-type: none"> On receipt of Section 19 will convene in-house rule revision group to write CN version. Will bring forward at RAC Rule Revision Team meeting Oct. 20 to foster industry approach on subject. Will file CN version by due date stipulated in Section 19. 	<ul style="list-style-type: none"> TC is satisfied with these actions and believes formulated rules will help to facilitate consistent application and use of these operations. In the meantime, CROR requirements must be maintained.
7. CROR Revisions for Remote Control Locomotive Operations - Detailed action plan and internal audit process	<ul style="list-style-type: none"> On receipt of Section 19 will convene in-house rule revision group to write CN version. Will bring forward at RAC Rule Revision Team meeting Oct. 20 to foster industry approach on subject Will file CN version by due date stipulated in Section 19. 	<ul style="list-style-type: none"> As above

**CN Action Plan
Engineering**

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
<p>1. Inspections - CN to advise the process they will put in place ensure compliance with the Track Safety Rules regarding inspections.</p>	<ul style="list-style-type: none"> • The longer term permanent solution is the implementation of the electronic Track Inspection System which will include: <ul style="list-style-type: none"> – Recording of regulatory track inspections – Documentation of TSR defect conditions – Logging completion of work activities including TSR defect repairs • In the interim until the T.I.S. system is implemented CN will: <ul style="list-style-type: none"> – Send notification to all Track Inspectors on proper procedures for documenting and retaining track inspection reports including logging of TSR defect condition repairs – Mandate Track Supervisors to do a monthly review of all track inspector log books and send notification to Asst. Supt Engr and Regional Chief Engineer of compliance <p>Use monthly review of track inspection logs to ensure corrective actions are properly noted</p>	<ul style="list-style-type: none"> • TC believes these measures are a good first step. However, CN must note that <i>Logging completion of work activities including TSR defect repairs and logging of TSR defect condition repairs</i> are not required by the Track Safety Rules. In documenting inspection records the Track Safety Rules (TSR) require remedial action to be recorded when a deviation to the TSR is identified through visual inspections and track geometry car and rail flaw detector car inspections. Remedial action is not limited to logging of condition repairs. It can take the form of other actions such as: halting of operations or applying a slow order. CN is to ensure track inspectors and supervisors are aware of this. • In reviewing track inspection logs monthly, CN must ensure remedial action taken when the deviation was first identified is noted.

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
<p>2. Deviations to the Track Safety Rules during track geometry car inspections and rail defects found by the rail flaw detector car - CN to lower the class of track on certain subdivisions</p>	<ul style="list-style-type: none"> • CN has implemented an aggressive program of increasing testing frequency for both our ultrasonic rail flaw detection vehicles and track geometry testing which includes: <ul style="list-style-type: none"> – Track geometry test miles increased by 15% from 2003 to 2005 with additional 6% increase planned for 2006 – Ultrasonic rail test miles increased by 55% from 2003 to 2005 with additional 10% increase planned for 2006 – Purchase of 3 high rail mounted track geometry systems – Purchase of 3 portable ultrasonic rail test devices for yard and industrial leads • All defect conditions found by track geometry testing or ultrasonic rail testing are immediately protected in accordance with the Track Safety Rules. • CN is actively reviewing all subdivisions where there are any significant increases in track geometry or ultrasonic rail defect rates to determine if an adjustment in track class is appropriate. It is expected that this review will be completed by the end of November, 2005. 	<ul style="list-style-type: none"> • TC acknowledges CN's aggressive plan to increase track geometry car and rail flaw detector car testing. CN's determination of the need for an adjustment to Track Class based on analysis of data obtained from these cars, is a good step towards managing track maintenance. • It is important to note that inspections are undertaken to ensure the track is safe for the operation of trains at authorized speeds and that conditions do not fall below the Track Safety Rules between inspections. TC's targeted inspections and analysis of track geometry car and rail flaw detector car tests indicate that CN is not using the data obtained from these tests to take necessary action so that track conditions do not deteriorate to a point where they fall below the TSR before the next inspection. From successive tests, the rate of deterioration of track conditions can be determined and appropriate action should be taken to prevent the condition from falling below the TSR.

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
<p>3. Rail maintenance – CN to advise the process in place to manage rail wear.</p>	<ul style="list-style-type: none"> • CN rail wear limits are not condemning limits but rather planned change out wear levels. It is CN's goal is to have rail changed prior to exceeding these designated wear limits. • CN's track geometry test car (TEST) has been upgraded in 2005 to measure rail wear – this new technology facilitates: <ul style="list-style-type: none"> – generation of real time reports of rail that has reached rail wear limits – reports are provided to the Track Supervisor and Regional Chief Engineer – trend analysis of rail wear rates to enable capital planning of rail change out to prevent exceeding target wear limits – automated rail wear reports will ensure that the Regional Chief Engineers are aware of all rail on their territory that is at or approaching rail wear limits • CN has significantly increased ultrasonic rail flaw detection testing to assist in detecting rail defect conditions before an in-service rail failure or broken rail derailment occurs. • CN is modifying our Engineering SPC's to include periodic visual inspection of joint bars in CWR territory as well as compromise joint bars. 	<ul style="list-style-type: none"> • TC is satisfied with these measures to manage rail wear and the modification of CN's Engineering Standard Procedure Circulars (SPC's) to reflect periodic visual inspections of joint bars in CWR territory. However, the number of defects in the joint areas found by ultrasonic rail testing and targeted inspections indicate that CN's maintenance of joints in jointed track areas may not be adequate. In addition to CN's commitment to include periodic visual inspections of joint bars in CWR territory, CN's plans must address the high number of deviations to the TSR in joint areas in jointed track territory.

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
<p>4. Ballast - Provide the process for maintaining ballast to comply with the Track Safety Rules</p>	<ul style="list-style-type: none"> • CN evaluates mud conditions and ballast contamination based on its ability to maintain cross-level, surface and alignment as well as properly distributing loads and restraining the track as defined in the Track Safety Rules. To do this we use a combination of: <ul style="list-style-type: none"> – Track geometry car test results; – Visual track inspection; – Feedback from operating train crews. • When conditions warrant, remedial work is undertaken to correct ballast conditions. Remedial work includes: <ul style="list-style-type: none"> – Spot mud removal using a Super gopher or backhoes; – Out of face undercutting to renew the ballast section; – Major ballast lift or out of face surfacing programs. • Ballast renewal will remain a key focus for CN over the next few years and to assist in expediting ballast deliveries for renewal programs. CN has recently signed a long-term lease for an automated GPS controlled ballast train from Herzog. 	<ul style="list-style-type: none"> • TC is satisfied with these measures.

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
<p>5. Crossing Sightlines -</p> <p>CN to advise its plan of action to correct the crossings that have insufficient sightlines and advise what process is in place to ensure continued compliance to adequate sightlines at crossings.</p>	<ul style="list-style-type: none"> a. CN is in the second year of a crossing inspection program that focuses on crossing sightlines, crossing surface conditions and signage. Crossing inspections are being undertaken by Track Supervisors, Asst. Track Supervisors and Engineering Services officers <ul style="list-style-type: none"> – To date we have inspected a total of 17,030 crossings across Canada (10,194 in 2004 and 6,836 year to date in 2005). b. When the crossing inspection determines that there is a defect condition that needs to be addressed the following actions are implemented: <ul style="list-style-type: none"> – For sightline deficiencies, immediate corrective actions are undertaken – For surface and signage issues, corrective actions are scheduled for implementation as quickly as possible c. After completion of the initial crossing inspection initiative, we will implement an annual crossing inspection requirement to validate sightlines, surface and signage. <ul style="list-style-type: none"> – Inspections will be documented in our track inspection system that is currently under development. – Inspections will include description of work required – Required work will be signed off and documented as completed by the engineering employee performing the work • CN is committed to working with Transport Canada to improve crossing safety but we are concerned with the ongoing delays in finalizing and implementing the new crossing regulations. Many of the existing crossing sightline issues stem from recent changes in Transport 	<ul style="list-style-type: none"> • TC acknowledges the delay in finalizing the new crossing regulations, however CN is reminded that the issue of sightlines has been ongoing for some time now. CN is also reminded that section 26.2 of the <i>RSA</i> requires road users to give way to railway equipment at a road crossing if adequate warning of its approach has been given. In the absence of adequate sightlines for a road user to see an approaching train, there is no warning of a train's approach to farm and private crossings. Also, section 11, <i>RSA</i>, requires that all engineering work related to grade crossings be in accordance with sound engineering principles. Adequate sightlines clearly fall under existing requirements for engineering work in accordance with sound engineering principles, as indicated on the published guidelines for section 11 of the <i>RSA</i>.

TC Item and Corrective Actions Requested	CN Action Plan	TC Comments
	Canada's interpretation and application of the existing G4A sightline requirements.	
6. Automatic Warning Systems - Detailed plan for dealing with internal processes	<ul style="list-style-type: none"> • All signal and crossing locations should have plan sets <ul style="list-style-type: none"> – Supervisors being requested to ensure deficient locations are identified • CN process for managing signal & crossing plans: <ul style="list-style-type: none"> – As installed plan turnaround target is 12 months – Locations with plan deficiencies to be identified in SAP/SETs system – CN to ensure dedicated resources allocated to catch up on plan backlog • Light Alignment: <ul style="list-style-type: none"> – LED signals will significantly reduce this problem – Notice sent on requirement to inspect and align lights • Insulated Joints: <ul style="list-style-type: none"> – Ongoing initiative to renew insulated joints underway – Importance of insulated joints in GCP/CW crossings will be reinforced with field track and signal employees • Completion of prescribed crossing tests: <ul style="list-style-type: none"> – CN strongly agrees that prescribed tests must be completed – SAP/SETs system being modified to generate reports that will enable tracking of test completion and flag deficient locations/territories • Request TC to provide a list of deficient locations inspected so we can ensure all deficiencies are corrected • Primary concern is to verify status of crossing tests – might be an issue with documentation residing in SAP vs field location 	<ul style="list-style-type: none"> • TC is satisfied with these measures. • TC believes that CN's GI – 310 (c) (4) must be clarified and a process developed to ensure that alignments are conducted as required.